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ABSTRACT

This paper considers the style and structure of broadcast educational television programs in relation to learning outcomes, and proposes a study to identify those key factors which intervene or affect this relationship. The types of structure examined include simple or complex and self-standing or integrated programs, and types of style include didactic or open-ended, active or passive response, and neutral or polemic. The intervening variables considered in this study are learner's attitudes toward learning (open/structured/not interested); learner's perception of the learning task required in viewing the program; learner's prior knowledge relevant to the content of the program; learners' prior skills in using television for educational purposes; and the amount of mental effort learners of different kinds are prepared to invest in programs of different styles and structures. It is proposed that six example programs be used, with 10 to 12 interviews for each program, and at least one group viewing and discussion. In a school setting, a set of questions will be answered by two or three children together discussing the programs; for adults, postal questionnaires will be sent for each program to approximately 200 randomly selected students or other adults who have requested support materials for educational television programs. A description of the evaluation and data analysis processes and a schedule for completion of the study conclude this proposal. (EW)

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THE RELATIONSHIP BETWEEN PROGRAMME
STYLE AND STRUCTURE
AND
LEARNING FROM TELEVISION

Prepared as a part of a joint
Open University/BBC-Open University
Production/BBC-Schools/TELEAC
Foundation research proposal on
"Learning from Television"

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Aim

1. To define the terms "structure" and "style" with regard to broadcast educational television.
2. To identify a number of different styles and structures commonly associated with broadcast educational television programmes.
3. To investigate the relationship between the styles and structures of broadcast television and learning outcomes.
4. To identify other key factors which intervene or affect the relationship between style, structure and learning outcomes in broadcast educational television.

Introduction

One of the main challenges facing educators today is the likely impact of modern technology on the teaching and learning process. The key question is: What effects will the presentation of knowledge through technological media have on the way people think and learn? For instance, both Singer (1980) and Postman (1983) have claimed that general television discourages scientific, deductive thinking and encourages impressionistic, intuitive thinking. These claims are themselves deductions, resulting from observation of the surface structure of general (entertainment) television. They are not however, based on empirical evidence of the effect of such structures on people's thinking, at least in any scientific sense. (There is an irony surely in Postman using intuitive thinking to support what he sees as a regrettable loss of scientific thinking due to television!) This study aims to identify whether, in deliberately educational contexts, the structures commonly used in broadcasting do encourage certain types of thinking and inhibit others, and whether these effects are general or merely specific to the aims of a particular programme.

If different media do tend towards structuring knowledge in different ways, this has obvious and serious implications for educational broadcasters. It is generally assumed, for instance, that learning from video cassettes will be more effective than learning from broadcasts, given the extra control and convenience that students have over cassette material (see Bates, 1983, for instance). What roles therefore remain for educational broadcasting? In particular, can the structures inherent in a broadcast format still actually have some advantages over structures inherent in a cassette format? If there are pedagogic advantages, then it is important to identify them, as they are not self-evident, and the identification of such advantages of broadcast television could prevent the premature undervaluing of broadcasting on purely pedagogic grounds (other reasons for using broadcasting in education, such as access, recruitment or motivation are still likely to remain).

If we can establish that there are differences in the way different media tend to structure knowledge, and that these differences are also associated with differences in the way that learning develops, such findings will have major implications for the way programmes are designed, and also for the selection of media, and the way different media should be combined.

Research Rationale

What do we mean by structure and style? It is relatively easy to define structure: it is the arrangement or organisation of parts into a whole. (In this study we shall be equating "parts" to the concept of "fragments", as delineated by Mason, 1983.)

Closely related to structure is style. Style is basically an elaboration on structure. In aesthetic terms, "good" style is not only functional, but integral to the structure. Consider an architectural analogy. The style of Moorish buildings in Granada, Spain, is integral to the structural features of the buildings. Thus in a particular television programme, the structure may be elaborate, but systematic, coming to a climax and "unravelling" at the end. The style of such a programme similarly may reflect the overall structure, by providing ambiguous visual images and sound track, and a slower pace, in the early stages, with sharper and more fast-moving images in the final parts of the programme where uncertainty is resolved.

In educational as in general programming, structure can vary from the very simple, continuous narrative, with a clear beginning, middle, and end, to vastly complex structures, with several themes developed simultaneously, and/or breaks in continuity of location or time. Another structural feature particularly important in education is the extent to which the programme is deliberately designed to be a self-contained unity, or to be just one part of a multi-media teaching package. Structural relationships between programme and text therefore are of central interest in this study.

Similarly, there can be considerable variations in the style of educational programmes. A programme can be highly didactic, in organising and structuring information in such a way that certain messages are strongly directed at the students; or very open-ended, where information is loosely structured, and students are left or encouraged to draw their own conclusions or make their own interpretations. (This illustrates further the close relationship between style and structure.) Similarly, a programme can overtly encourage active responses from viewers during a programme: or alternatively a programme may provide no direct guidance to viewers about how they are expected to respond. Finally, programmes can take a deliberately neutral stance, presenting contents "objectively" and with no overt commentary by the programme makers on the value of what is presented; or programmes can be polemic, with a fierce identification by the programme makers with the ideas presented. This does not mean that programmes with a "neutral" style do not have implicit messages which slip across without the programme makers being aware of such messages. It is the manner and techniques used by the producer within the programme which identifies the style as neutral (e.g. the use of equal time for opposing viewpoints; a neutral chairman; a balanced commentary).

We believe that certain styles and structures are favoured in educational television, and we aim to work primarily on those that are frequently found in broadcast educational television.

Why these aspects of structure and style?

There are many ways of approaching the issue of structure and style in educational programming. One is to look at structure and style in terms of aesthetic response. There is a vast literature on this issue, particularly regarding film and literary works. Other approaches include discourse

analysis, and the structuring of narrative or argument. The various aesthetic, sociological, linguistic, literary and philosophical approaches to structure and style all have their value, and part of the study aims to draw on such approaches where relevant, particularly with regard to student motivation and attention.

The reason though why we have settled on structural factors such as complexity and integration, and stylistic factors such as didacticism, overt activity and neutrality, is because these are directly related to educational objectives and theories. Our assumptions are that such educational features of structure and style are more likely than other structural and stylistic features to influence the way students process and learn from material presented through educational television. Also these structural and stylistic features relate to theories or styles of teaching, such as the extent to which teachers should organise learning materials, and the extent to which students themselves should be responsible for construing their own interpretation of learning materials.

Nevertheless, part of the study will be concerned, by means of a further literature search, with widening the range of structural features, if the research literature strongly suggests other structural and stylistic features which may offset learning from television.

Is Television Different from other Media in Terms of Structure and Style?

The features of structure and style in which we are interested are by no means specific to television. Furthermore, structure and style are in the control of the creators of material, and can be altered at will. (This is just as well, as there would be less value in doing research on aspects of programmes which could not be changed.) Thus, as with a text, a programme could be either highly didactic or open-ended, tightly or loosely structured. However, structure and style are particularly influenced by fashion and convention. For instance, documentary-style programmes, which tend to be complexly structured, self-standing, open-ended, passive in terms of overt response, and neutral, are very popular in adult educational television; and the magazine format, with a simple but segmented structure, didactic, active and polemical style, is very popular in children's educational television. Thus, while all types of structure and style are possible, certain

structures and styles appear to be more popular than others in educational television. Furthermore, some of these popular structures and styles of educational television programmes are quite different from the structures and styles commonly found in text books (although interestingly the differences between programmes and texts are much greater for adults than for children, where the magazine style and structure is also common in school workbooks, for instance). Thus research in this area may not be unique to television, but nevertheless it should tell us a great deal about the learning implications of certain popular types of educational programmes, with widely generalisable findings.

Are Structure and style objective? As with the other studies in this proposal we take it as axiomatic that learners are active. Thus with structure and style, students will bring their own interpretations and efforts at structuring material. With loosely structured material, students may well strive to impose their own structure. However, we believe from previous experience of analysing Open University programmes, that it is possible to identify objectively the structure and style of programmes in educational terms, by means of relatively simple and unambiguous criteria. In carrying out an analysis of the structure and style of a broadcast programme for research purposes, one has the advantage of working from a permanent record of the programme, via tape. The student may not have a similar advantage. One of the aims in fact of this study is to see to what extent students impose their own structures and interpretations on broadcast material and to what extent this differs from or matches the "objective" structure and style of a programme.

Structure, style and work. Of particular importance for this study is the effect of various structures on students' anticipatory schema, and the effect this has in turn on their response to the material. For instance, Salomon (1983) has argued that learning is strongly influenced by the amount of invested mental effort (AIME) put into an activity. He has also argued that television is often associated with low AIME. We wish to see whether this holds true for a wide variety of educational television programmes, or whether certain structures and styles lead to a greater AIME than others.

In many structural analyses, the importance of "deviation" or the violation of continuity for holding attention and eliciting an active response from the learner is often stressed. This idea is similar to Piaget's concepts of accommodation and assimilation. Salomon (1985) refers to this as the uncertainty principle. People feel uneasy with uncertainty, and strive to remove it. This requires mental work. Uncertainty can be achieved structurally and stylistically and is a common feature of many television programmes, including educational ones. Salomon however points to the need to use such a technique with extreme care. Mental effort must be invested in activities relevant to the learning tasks or objectives of the programmes. Thus while students for instance may favour didactic programmes they may not be structured in such a way as to require as much mental effort as open-ended programmes. On the other hand, if students misunderstand the purpose of the open-ended programmes, they may not invest sufficient mental effort in the first place to benefit from a loose structure. Thus the relationship between structure, style and the mental work generated will be an important aspect of this study.

Active Learners. If we take the view that the learner is active, seeking meaning and resolving uncertainty, any study of learning from television must take into consideration what the learner brings to the act of learning. We might term such features intervening variables, since they influence the relationship between features of the programme and the process of learning. There are many such possible intervening variables but for this particular study, we will concentrate on those which seem theoretically and empirically to have most relevance to the relationship between programme structure and style, and learning.

Matsui (1981) found that the response of Canadian adults to educational television was very much influenced by their perceived needs with respect to learning. In all, Matsui identified six different groups of people, but in essence these represented, in stronger or weaker measures, three radically different attitudes to learning from television. By far the largest group, constituting roughly half the population, were those described by Matsui as "expressing below average interest in learning." Although heavy users of television, this group used television primarily for entertainment purposes, and not for information, culture or education. The second, constituting about

In addition, learners' prior knowledge and skills are likely to offset radically their learning from a programme. This is not merely a matter of comprehension (obviously a programme has to be pitched at the right level and pace for the target group); if the programme aims to develop skills based on certain information learners must already have some comprehension of that information before it can be used in their interpretation of the programme. Furthermore, it is not just a question of prior knowledge. The act of interpreting a programme requires skill. Such skills are not innate nor always acquired automatically. They may need to be deliberately developed, either before hand or in the programme itself. Thus the skills and prior knowledge that the learners bring to the act of viewing are likely to influence crucially the way they learn from programmes.

Perception of the learning task can of course be influenced by "advance organisers" or by signposting. However, signposting may be relatively independent of the structure or style of a programme. For instance, the broadcast notes may act as signposts without affecting in any way the structure of the programme. Furthermore, students may not read the notes. Another study is primarily concerned with signposting; in this study, we are concerned with signposting only so far as it effectively acts to "cue" learners to the learning task. As far as this study is concerned, then, signposting is a secondary or subsidiary variable.

The important intervening variables for this study then are as follows:

- learners' perceived needs/attitudes to learning (open/structured/not interested)
- learners' perception of the learning task required in viewing a programme
- learners' prior knowledge relevant to the content of the programme
- learners' prior skills in using television for educational purposes
- amount of mental effort learners of different kinds are prepared to invest in programmes of different structure and style.

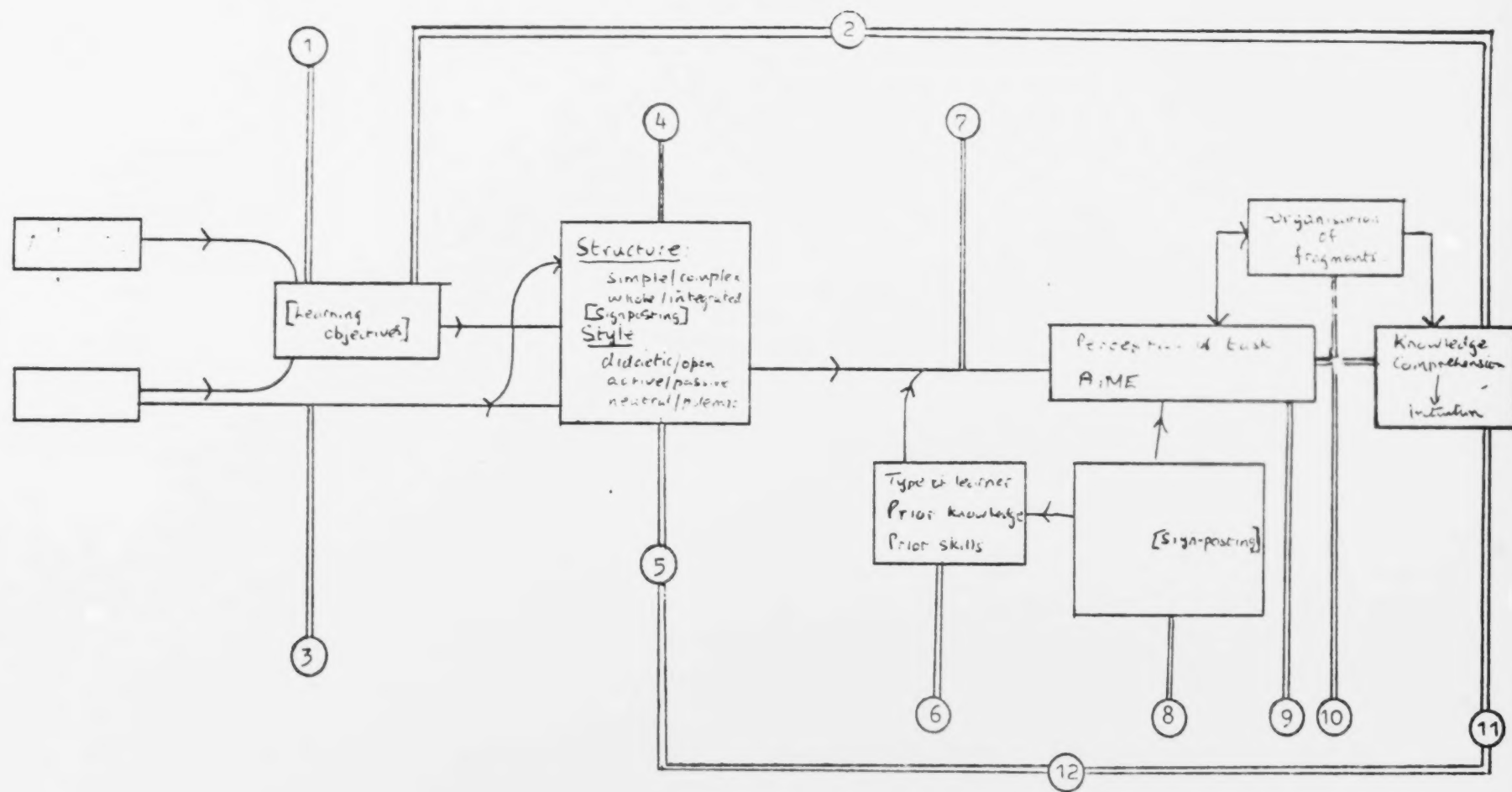


Figure 1. Research framework

Structure, style and thinking. The key issue in this study though is the extent to which certain structures and styles encourage some kinds of thinking and inhibit others.

We believe that a great deal of caution is necessary when considering what is meant by learning from television. As Schramm (1977) has pointed out, most studies based on a comparison of learning across different media have resulted in no statistical differences. This does not necessarily mean though that there are no differences in learning from different media; it merely means that within the selected design and on the measures used there were no differences identified. Could it be that such studies have consistently measured the wrong parameters (or the right parameters in the wrong way)? Gross (1974) has pointed to the danger of assuming that thinking is above all a verbal activity. It is important then not to limit our consideration of learning from television solely to verbal processes.

But perhaps more fundamental is the hypothesis of Olson and Bruner (1974) that "media converge as to the knowledge conveyed, but diverge as to the skills they assume and develop." This the crux of the theoretical position being taken in this study. Olson and Bruner claim that knowledge is invariant across media. In other words, knowledge or content can be described equally well through any medium - you can know "of" something just as well through television as through text. But to get to know something through a medium requires the development of a skill - such as reading, or perception, or manipulation. Not only do these skills have to be learned, but they do not readily transfer from one medium to another. Thus learning well enough to recognise visually the difference between a zebra and a horse will not help you recognise the difference if described in print. You have to know how to read and make verbal comparisons before you can interpret the words.

If Olson and Bruner's hypothesis is correct, what mental skills are assumed and developed by which media? While they relate three methods of instruction (contingent experience, observational learning, and communication and instruction via symbolic systems) rather weakly to "technological realisations" (i.e. different media), they do not (perhaps wisely) go on to predict what mental skills are most likely to be assumed or developed by which media. Salomon (1979) though, has, through very skilful experimental design, been able to identify how aspects of filmic/television coding elements can be

made to affect the mastery of certain cognitive skills. However (again no doubt wisely) he concentrated his efforts primarily on perceptual skills, such as changing points of view and identification of embedded figures. The question for this study (perhaps very unwisely) is:

To what extent and under what conditions, does television help or hinder the development of more abstract cognitive thinking?

There are several reasons why this might be considered yet another wrong question to ask. Any study of learning from media has to acknowledge the limitations of mediated or vicarious experience, compared with direct experience. Piaget () has claimed that "knowledge is derived from action..... To know an object is to act upon it and to transform it." However, while direct experience is a necessary pre-requisite or foundation for learning, especially in the early years of life, it is clearly not the only means by which learning can take place. Media can in fact provide multiple experiences more widely and effectively than direct experience alone; and multiple experiences are essential for deep understanding or knowledge, since only through a variety of experiences can the boundaries of an idea or concept be defined.

Piaget also demonstrated that activity can be internalised and condensed mentally. Indeed, once skills become competent, the cognitive aspects of that skill become redundant and unconscious. Polanyi (1958) for instance defines skilful performance as "the observance of a set of rules which are not known as such to the person following them." However, this raises another difficulty, this time methodological. As Gross (1974) puts it: "Cognitive elements of skilful performance are not amenable to being coded and comprehended meaningfully." Thus there is clearly a limit to the kind of information that can be directly elicited verbally from skilful learners with regard to their acquisition of that skill.

Furthermore, as Olson (1974) (and many others) have pointed out, "the invention of means by which to transform spoken language into written language apparently had the additional consequences of making language analytic and logical." Does it then follow that the ability to convey

information in other than verbal forms will have implications for developing or encouraging non-analytic or "illogical" forms of thinking? There are reasonably well-developed means of assessing analytic and logical thinking, but do we yet know what other forms of thinking are developed by media such as television, which mix verbal with non-verbal forms of communication, yet alone know how to measure them?

lastly, there is the problem of how people relate what they learn from television to what they learn through other media. How is what is learned through one set of symbol systems "translated" into another symbol system? The problem can be seen when one listens for instance to most painters talking about art, which is often an arid experience compared with watching them performing. At the same time, experiences through multiple media seem to add to richness in thinking. Learning and thinking are continuous and dynamic processes which are not limited to a set time following a programme. What is seen on television is related to prior experiences derived through other experiences, and in turn is modified by subsequent experiences. Thus learning is continuously being translated and transformed.

For these reasons, we believe it is essential to take a very cautious approach to measuring learning from television. Collection of data needs to be done in an exploratory manner, using methods which provide a variety of information about how learners have responded to and used the television material.

In particular, we believe it is important to use an approach which will capture the symbolic richness of television. This means using an approach which does not direct learners particularly towards the verbal elements of a programme. It is also essential to structure the enquiry so that learners are not restricted to conventional modes of response (such as verbal testing). We wish then to use the concept of "fragments" as a means by which to break into the learning process (see Mason, 1983). By asking learners to describe "fragments" of programmes that particularly resonated with them, we hope that this will allow learners to reflect the perhaps unique ways in which the programme stimulated their thinking. In this way, we can identify which and how "fragments" were used to help learners in their studies, how learners related or structured different fragments into a meaningful whole, and how these fragments related to other aspects of their learning and studying.

This does not mean though that we do not have a strong analytic framework for interpreting the data collected in this way. While such an approach may indeed reflect other modes of thinking and learning not anticipated by us, we shall also be looking for evidence of more conventional learning skills developed by different kinds of programmes. In particular, we shall be looking for relationships between different programme structures and styles, and different types of cognitive objective. We plan to use Bloom et als. (1981) analysis of cognitive objectives, namely, knowledge; comprehension; analysis; application; synthesis; and evaluation.

Particularly important for this study is the hypothesis that television tends to develop intuitive, impressionistic thinking, rather than logico-deductive thinking. Thus the study will have to look at the quality of the different levels of cognitive thinking. For instance, television may encourage evaluation objectives, in terms of viewers making an assessment of what they see. But what criteria do they use for making such an assessment? Do they selectively or unquestioningly accept (or reject) evidence as presented through television, and base their judgement on general (or specific) impressions left by the programme? Or do they use the presentation of differing and perhaps contrary points of view in a programme as a basis for testing out ideas presented in the programme or elsewhere? As Bloom et al (1981) put it: "Many judgements are expressions of taste, whim, convention or habit... they are rarely based on criteria and standards that are made explicit. In contrast, the type of evaluation found in educational objectives appear to us to be among the most complex cognitive behaviours....the student is presumably required to make judgements about something he or she knows, analyses, synthesises, and so forth, on the basis of criteria which can be made explicit."

Another hypothesis is that because of the richness of television symbol systems, combining sound, moving pictures, colour, text, etc., and the ephemeral nature of the medium, students have to interpret the material very quickly, running rapidly together a lot of ideas, perceptions, and stimulated thinking. Thus interpretations of programmes are likely to be much more individualistic, and possibly lead to more creative or "unbounded" thinking than perhaps would a text or lecture. Thus one might assume that certain structures and styles of television might encourage intuitive thinking,

generating new connections or original ideas and thoughts. We do not think that Bloom et al's work (1956; 1981) deals adequately with creative or intuitive thinking. In this study, though, we are particularly interested in television's potential for generating new hypotheses, relationships or alternatives, otherwise once again we run the risk of undermeasuring its potential. Thus to the cognitive objectives included in Bloom et al's taxonomy we wish to add intuition, defined as the ability to generate new generalisations, relationships or alternative explanations.

Main Hypotheses in This Study

First of all, the study is concerned with three different kinds of variable:

- (a) Input variables:
 - i. Structure: simple/complex
self-standing/integrated
 - ii. Educational Style: didactic/open-ended
active/passive response
neutral/polemic
- (b) Intervening variables:
 - i. viewers' perceived learning needs
(open/structured/not interested)
 - ii. viewers' perception of learning task
 - iii. viewers' prior knowledge of programme material
 - iv. viewers' prior skills in using television for educational purposes
 - v. amount of mental effort viewers of different kinds are prepared to invest in programmes of different structure and style

- | | | | |
|-----|----------------------------|-------|---------------|
| 6.1 | <u>Learning variables:</u> | i. | Knowledge |
| | | ii. | Comprehension |
| | | iii. | Analysis |
| | | iv. | Application |
| | | v. | Synthesis |
| | | vi. | Evaluation |
| | | vii. | Intuition |
| | | viii. | → ? |

They can be located as in Figure 1 in terms of the overall framework.

The hypotheses we are interested in are as follows:

1. Simply structured, integrated programmes adopting a didactic, active and neutral style ("instructional").
 - i. These will lead to greater knowledge acquisition, comprehension and application (where application is explicitly demonstrated in the programme) than other kinds of programmes, but will not encourage analysis, synthesis, evaluation, or intuition.
 - ii. Such programmes are likely to be perceived as valuable by open and structured learners, provided they do not already have high levels of knowledge in this area, but not by interested learners.
 - iii. All types of learner are likely to recognise accurately the learning task with such programmes, although uninterested learners will lack skill in learning from such programmes.
 - iv. Except for uninterested learners, learners with little prior knowledge will be willing to invest more mental effort into these programmes than in other programmes. Learners with extensive prior knowledge of the programme material will invest little mental effort.

.. Simply structured, self-standing programmes adopting an open, active and polemic style ("magazine").

- i. These will lead to some knowledge acquisition when prior knowledge is low, and encourage skills of application and evaluation.
- ii. Such programmes are more likely to be perceived as valuable by open and non-interested learners, but not by structured learners.
- iii. All types of learner will recognise accurately the learning task, and will have some skill in using this kind of programme.
- iv. Structured learners are unlikely to invest much mental effort in such programmes.

4. Complexly structured, self-standing, open-ended, passive and neutral programmes ("documentaries").

- i. These will encourage synthesis, application, evaluation and intuition, but only in open learners with prior knowledge and skills.
- ii. Such programmes will be perceived as valuable by open and non-interested learners, but not by structured learners.
- iii. Only open learners with prior learning skills will recognise the learning tasks, and be prepared to invest much mental effort.

Research Methodology

1. Programme Selection. This will depend very much on the research requirements of other people in this project, but it will obviously help to identify clear examples of the three kinds of programme. Ideally, one would like two examples of each kind from each of the three production centres, (i.e. six examples of each kind in all). Since from each centre there is a minimum of 200 programmes a year to choose from, it should not be difficult to identify two examples of each kind.

2. Programme Analysis

- i. Simple/complex structure. A content analysis will be undertaken from a video record of the programme, dividing the programme into a linear sequence of discrete scenes, with separate analyses for sound and vision (see Appendix 1 for an example). The structure will be determined by the kind of reasoning behind the linking of various scenes together, in terms of the educational story line. Particular attention will be paid to apparently unrelated sequences, branching and commentary.
- ii. Integration. There are two kinds of integration: organisational and conceptual. Organisational integration can be identified by the explicit links made between programmes and other media. In a classroom situation, it can be identified by the extent of pre- and post-viewing activity organised around the programme. Conceptual integration relates to the overlap in content (although different skills may be sought from each medium). In a sense, most programme material is likely to be conceptually integrated or at least related to other media. Since we are concerned here with pedagogic features of structure, the analysis will concentrate on organisational integration, although any clear lack of conceptual integration with other media will also be looked for.
- iii. Didactic/open-ended. In this aspect of analysis, we shall be looking for the extent to which the programme makes explicit the teaching process, in terms of overt signposting, statements of objectives, demonstration of teaching processes (e.g. modelling, analysis by the teacher/commentator) and explicit drawing of conclusions.
- iv. Active/passive. This is a measure of the extent to which viewers are openly encouraged to make an active response to programme content during or immediately after the programme. This could be in the form of questions in the commentary, directions to observe something or draw conclusions, and the provision of time for the viewer to respond. Covert activities (such as discontinuity between scenes to stimulate mental effort) will not be included in this dimension, but will be accounted for in terms of complexity of structure.

- v. Neutral/polemic. This is a measure of the extent to which the programme makers are seen to identify themselves clearly with a point of view. This can be identified in a number of ways: extent to which a commentator makes evaluative judgements; balancing of opposing viewpoints; use of a neutral chairman in discussions, etc.

Each of these five dimensions will be scaled on a five-point scale, in relation to other programmes in the sample of 18. Two of the researchers will independently analyse each programme, and wherever possible the analysis will be checked out with the programme producer (and video/film editor, if appropriate). The analysis will be preceded by a two-week period in which a literature search in structure and style in television and film will be conducted, in case one or two other variables significant to an educational analysis are needed.

3. Viewer selection

- i. A minimum of 10-12 individual interviews (lasting approximately one hour each) will be required on each programme, using a pre-prepared schedule, requiring 180 - 200 interviews in all. Approximately 7 minutes of this interview will be devoted to this aspect of the study.
- ii. At least one group viewing and discussion will be organised for each programme, and the discussion will be sound recorded (18 - 20 discussion groups). About 2 or 3 'cueing' questions related to this study will be asked.
- iii. In the school situation, a set of questions will be answered by two or three children together discussing the questions (about 12 small groups per programme, for six programmes, using two schools for each programme). For adults postal questionnaires will be sent to approximately 200 students for each programme (12 x 200 = 2400 questionnaires in all). Viewers will be randomly selected from registered students in the OU case, and from viewers who wrote in for support materials in the case of TELEAC.

4. Interviewing Variables

Selected subjects will be asked a set of questions to identify possible intervening questions, by means of a questionnaire, part of which will be administered just after viewing. Using some of Matsui's questions, subjects will be asked their attitudes to learning. Subjects will also be asked to indicate the extent of their prior knowledge regarding the content of the coming programme (Taylor, 1971, and Trenaman, 1964, have both shown that learners' self-assessment of prior knowledge is generally very reliable). Subjects will also be asked how confident they felt in using the television programme for learning, to identify their perceived level of skill in using television. They will also be asked what they thought the learning task was (using a pre-coded set of options), and how mentally difficult or taxing they had found the programme.

5. Learning Processes

This is the most difficult part of the data collection. Programme 'fragments' will be used as a means of exploring the relationship between structure and learning. Subjects will be asked to indicate what scene or images they particularly remembered from the programme. They will be asked why they found this so striking, how it related generally to what they are learning, and how it related to other scenes or images in the programme. In this way, subjects can determine themselves the nature of their response and the visual aspects of the programme can be allowed to play a role in determining learners' responses. In addition, there will be a series of questions requiring responses indicating knowledge acquisition, comprehension, analysis, application, synthesis, evaluation and intuition, based on both the 'fragment' subjects themselves suggested, and then on key elements of the programme as defined by the programme designers. Apart from the school situation, an attempt will be made to design a postal questionnaire to tackle these issues, using a mixture of open-ended and closed questions. A small postal pilot, based on preliminary interviews, will be tried first. Thus a combination of interviews, group discussions and postal questionnaires will be used.

6. Data Analysis

Discussions will be transcribed. Interviewers will fill in schedules as they go, using mainly open-ended responses, and a tape recording to help subsequent analysis. Open-ended data will be coded according to (a) the cognitive level indicated, and (b) the quality of thinking within a given level. This will inevitably be a somewhat subjective process, to be carried out by the researcher and the research assistant independently, then cross-checked. With regard to the 2,400 postal questionnaires, a 1 in 10 sample of open-ended questions will be analysed in depth.

Schedule

1984

<u>January:</u>	Select programmes
<u>February:</u>	Analyse programmes
<u>March:</u>	Design and pilot questionnaires/interview schedules
<u>April:</u>	Translate questionnaires/interview schedules
<u>May/June:</u>	Collect data
<u>July:</u>	Code questionnaires and process
<u>July - Nov.:</u>	Analyse qualitative data
<u>August:</u>	Phase 1 multiple regression analysis
<u>Sept. - Oct.:</u>	Analyse Phase 1 multiple regression analysis/questionnaire data
<u>November:</u>	Re-run multiple regression analysis
<u>October-Jan.</u>	Write report

1985

<u>January-Nov.</u>	Repeat cycle for re-made programmes
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Manpower

Research assistant (shared with Diana, Clive and John):	9 months 1984
	12 months 1985
Myself:	3 months 1984
	4 months 1985